DOCUMENT RESUME

ED 442 416 HE 033 013

AUTHOR Davis, Andrea M.
TITLE Effects of Gender, Cognitive Learning Styles, and Computer Attitude on Students' Course Satisfaction: A Preliminary Study II.
PUB DATE 2000-01-16
NOTE 63p.; For Preliminary Study I, see HE 033 012.
PUB TYPE Reports - Research (143)
EDRS PRICE EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Academic Achievement; Cognitive Measurement; *Cognitive Style; Cognitive Tests; *Computer Anxiety; Computer Uses in Education; *Course Evaluation; Females; Higher Education; Instructional Effectiveness; *Sex Differences; Statistical Analysis; Student Attitudes; *Student Evaluation of Teacher Performance; Student Surveys; Tables (Data); Teacher Student Relationship; Undergraduate Students; User Friendly Interface
IDENTIFIERS Texas

ABSTRACT

This second part of a preliminary study considered the impacts of gender, cognitive learning styles, and computer attitudes on students' course satisfaction, based on their perceptions about their instructors' teaching strategies. The sample consisted of 60 male and 80 female undergraduates enrolled in two basic/developmental mathematics courses taught by one male and one female instructor at a four-year public and religiously affiliated institution in the southeastern part of Texas. Students completed a questionnaire that focused on their perceptions of instructor classroom attitudes and teaching effectiveness; perceived computer anxiety and attitude; and visual/global embedded figures. Course satisfaction was measured by students' overall scores in the teaching effectiveness and evaluation part of the survey questionnaire. The study found three significant effects: (1) there was significant gender effect in students' course satisfaction with female students consistently rating instructors higher (worse) than male students; (2) there was significant computer attitude main effect on students' course satisfaction--the insignificance of the instructors' effect was a consequence of how students perceived instructors' attitudes and teaching effectiveness; and (3) there was a significant effect due to cognitive learning styles. Field-dependent students were more satisfied with their instructors and the course than field-neutral and field-independent students. (Contains about 132 references.) (RH)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 442 416

Running Head: Preliminary Study II

Effects of Gender, Cognitive Learning Styles, and Computer Attitude on Students' Course Satisfaction: A Preliminary Study II

Address Correction:

Andrea M. Davis, Doctoral Candidate
DREADAVIS@AOL.COM
Department of Educational Leadership
College of Education
Grambling State University
Grambling, Louisiana, 71245

January 16, 2000

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY
A. DAVIS
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
2A

HE 033 013

Effects of Gender, Cognitive Learning Styles, and Computer Attitude on Students' Course Satisfaction: A Preliminary Study II

Abstract

This preliminary study considered the impacts of students' gender, cognitive learning styles, and computer attitude on students' course satisfaction. The sample consisted of 140 (60 male & 80 female) volunteer developmental students enrolled in two Basic/Developmental Mathematics courses taught by two (one male[1] and one female) instructors. The majority of the sample clustered within the field-neutral cognitive learning style and moderate computer anxiety categories. The overall/global means (SEM & SD) for the GEFT, computer Attitude scale, Computer Anxiety scale, test Scores, and course satisfaction scores are 10.21 (0.27 & 3.14), 88.11 (1.20 & 14.23), 81.80 (1.09 & 12.87), 75.39 (1.35 & 16.00), and 110.96 (3.27 & 38.13) respectively. None of the students at the low computer attitude group was field-dependent and, none of the students at the high computer attitude group was field-independent.

A 2 (gender of participant)-by- 3 (cognitive learning styles)-by- 2 computer attitude ANOVA with course satisfaction as the outcome variable revealed a significant global mean course satisfaction, ($F(12, 128) = 101.46$, $p < 0.001$); gender main effect, ($F(1, 128) = 11.05$, $p < 0.01$); computer attitude ($F(1, 128) = 8.54$, $p < 0.05$); and cognitive learning styles ($F(2, 128) = 31.45$, $p < 0.01$). None of the interaction effects were found to be significant. Male students consistently gave lower (better) mean rating scores than female students to their instructors. These results were consistent even when the four components of the TEES factors were included in the analyses. The effect due to instructor was not significant ($F(1, 139) = 1.69$, $p = 0.194$). Furthermore, field-dependent students were more globally satisfied with their instructors and the course than the field-neutral and field-dependent students. The field-neutral and field-independent students were not differentially dissatisfied with their instructors and the course. Students with high computer attitude were more satisfied with their instructors and the course than the low attitudinal students.

[1] Special thanks to Dr. T. Nelson Ikegulu for administering the instruments at the pilot site.

Effects of Gender, Cognitive Learning Styles, and Computer Attitude on Students' Course Satisfaction: A Preliminary Study II

Introduction

A common sense notion is that students will achieve more when they are satisfied with the instructor, course structure, and instructional delivery (Kelly & Chapman, 1977; Ogunyemi & Ikegulu, 1998; Pascale, 1979); and that students preferred instructors who are empathetic, charismatic, and student-oriented (Ikegulu & Barham, 1999; Ogunyemi & Ikegulu, 1998). A number of studies have shown that students who believe they can (or want to) control their instructional environment learn more in unstructured classrooms. Similarly, several other studies suggest that students who are passive receivers of instruction tend to lean more in structured learning environments and, perceived the course as less difficult (Crandall, et al., 1965; Johnson & Morris, 198; Mehrabian & Hines, 1978; Strom &Hocevar, 1990; Strom, et al., 1982, 1987).

Strom and Hocevar's (1990) correlational design study of the preference for course structure and student control aimed at determining the internality and dominance-submissiveness to students' preference for course structure and course difficulty. A nonrandom convenient sample of 86 volunteered college students were administered the Crandall, et al.'s internality/externality and the Mehrabian and Hines's (1978) dominance-submissiveness measures. In addition, the Course Structure Inventory (CSI), an index of students' satisfaction with course characteristics, was also administered. The CSI required students to indicate their satisfaction with high or low structure characteristics on a five-point "like or dislike" scale.

Contrary to the wide spread belief that internal and dominant students learn more in unstructured instructional environments, their results indicated that these type of students actually learn more in an unstructured learning environment characterized by attitude toward course difficulty, attitude toward course structure, and course internality/externality.

The emphasis on Johnson and Morris (992) study was on the effect of incorporating research activities into an introductory sociology class. This study presented findings on an analysis of questionnaire data derived from a year-long (one academic year -- Fall, Winter, and Spring -- study of the impacts of student oriented, computer-based research on students' attitudes toward the course (Sociology) and selected course activities. The study design incorporated three different treatment: random mandatory (RMT, N = 46), volunteered students (VST, N = 64), and total mandatory (TMT, N = 323). A system of computer-assisted instruction (CAI) and an SPSS save file based on the General Social Survey (National Opinion Research Center, 1978) for use by students participating in the research activities was developed. The CAI lessons were designed to acquaint with a general research paradigm that focused on such topics as developing research topics, research questions and hypotheses, operationalizing the concepts and constructs in a research study, and the use of SPSS and some basic statistical procedures.

The concepts "learning styles" and "cognitive styles of field dependence status (CSFDS)," have been operationalized in the literature as independent and contrasting modes of learning. While some studies identified learning styles as stable traits, others noted that CSFDS are the differential learning modes that afford the learners the ability to style-shift their learning styles in learning and/or instructional environments. In this study, both concepts were combined to mean

"cognitive learning styles" (Davis, 1999)

The purpose of this second preliminary study was to determine the impacts of gender, computer attitude, and cognitive learning styles on students' course satisfaction based on their perceptions about their instructors' teaching strategies. The variables in this study are as contained in the first preliminary study (Davis, 1999).

Course Satisfaction

Course satisfaction is a concept used in this study to assess students' perception about the extent of their course satisfaction based on how they perceived their instructors' use of the systems designs principles and, the expectant gain from such utility, and how the use of these principles of instructional systems design paradigm affect their course grades.

Instructional systems design (ISD) is a complex integrated process that involves people, procedures, ideas, devices, and organization, for analyzing problems; and devising, implementing, evaluating, and managing solutions to these problems in a controlled learning and purposive situation (Heinich, Molenda, Russell, & Smaldino, 1996, p. 411).

Conducting Analysis: The students' perceptions about the majority of their instructors' assessment of the student, learning tasks, and the learning context to facilitate the realization and achievement of instructional goals.

Determining Objectives: The students' perceptions about the majority of their instructors' development of instructional strategies using appropriate organizational, management, and delivery techniques to effect learning, induce motivation, and enhance recall.

Focus on Students: The students' perceptions about the majority of their instructors' development of student-centered and learner-empowered instructional strategies and fairness in grading.

Value Training: The students' perceptions about the majority of their instructors' incorporation of feedbacks from colleagues and "significant others" into the instruction for identification, organization, and implementation of lesson plans in their (instructors and students) instructional materials.

The Group Embedded Figure Test

The visually-oriented Group Embedded Figure Test (GEFT, Witkin, 1977; Witkin, Oltman, Raskin, & Karp, 1971) has been defined as a cognitive learning styles and, and will be used in this study to investigate the relationship of the three styles of cognitive learning to academic achievement and course satisfaction relative to gender and computer anxiety-apprehension and computer attitude.

Cognitive styles are conceptualized as stable attitudes, preferences, or habitual strategies determining a person's typical modes of perceiving, remembering, thinking And problem solving (Messick, 1976, p. 26). The visual perception in information processing is based on individual perceptual skills. When learners have similar visuals on the screen, their perceptions for the visuals may be different. These differences among learners are based on their cognitive styles, learner characteristics, or perceptual skills. Field dependent status is "perceptual differential" where the organization of the prevailing field determines the person's perception. Witkin (1979) defined psychological differentiations for the learners by indicating that the field-dependent And

field-independent cognitive styles are contrasting modes of processing information. In essence, learners with a field-independent style are likely to use internal referents as primary guides referents (p.14). In other words, field-dependent and field-independent cognitive styles refer to a general psychological differentiation, in which a person perceives part of a field as discrete from the surrounding field as a whole (Burkhalter & Schaer, 1985).

Cognitive Learning Styles.

These are the unique ways an individual gathers and processes information and the means by which an individual prefers to learn (Lowery, 1994; Davidson, 1990); "a person's characteristic ways of information processing, feeling, and behaving in and toward learning situations" (Smith, 1982; Wlodkowski, 1985, p.179). A particular learning style is the cognitive style of field dependent status. This learning style is usually measured by the Group Embedded Figure Test (GEFT, Witkin, 1979; Witkin et al., 1971, 1977, 1981).

The cognitive styles of field dependence status will be determined as field-dependent (FD), field-neutral (FN), and field-independent (FI) based on the visually-oriented Group Embedded Figure Tests (GEFT, [Witkin, 1977, 1979; Witkin, Oltman, & Karp, 1971]). The Field-Independent learner tends to articulate figures as discrete from their backgrounds and can more easily differentiate objects from the embedding context. The Field-Dependent learner, on the other hand, tends to experience events within the content of the whole. The Field-Neutral learner is mid-way the cognitive spectrum.

Computer Attitude

Computer utilization affords the luxury of combining traditional classroom activities with

that of technology-driven classroom environment. This chapter has provided a brief description of the history of computer technology, and how it (computer or educational technology) has assumed a place in education. Additionally, this chapter has provided the statement of the problem, the purpose of the study, the significance of the study, research questions, and hypotheses

Computer attitude is a behavioral by-product of an individual's experiences with certain situations and within certain cultural groups (Cothern & Collins, 1992, p.85); a combination of a perception with a judgment that often results in an emotion that influences behavior (Ellis, 1962; Wlodkowski, 1985, p. 72).

Students' overall mean score on the group-embedded figure test (GEFT) was computed and those falling one standard deviation unit above (and below) the overall mean GEFT score for the entire sample will be designated as field-independent and field-dependent respectively; whereas, those within the sample GEFT mean will be classified as field-neutral. The rationale for this categorization stemmed from the fact that educators and practioners need to understand how these three groups of cognitive learning styles are affected by the learners' perceived levels of computer anxiety/apprehension (low, moderate, and high) and computer attitude (low and high).

Background of the Proposed Study

To embrace the benefits of educational/instructional technologies, institutional faculty members must have positive attitudes about them and feel self-efficacious in using them. It is likely that students' and instructors' attitudes and self-efficacy are strongly influenced by their prior training; and the instruments used to assess computer anxiety-apprehension, computer attitude, and

self-efficacy about computer technology are limited in content and context (Ashton & Webb, 1986; Delcourt & Kinzie, 1993). For this reason it is important, using reliable and valid instruments, to examine what sorts of attitudes and perceptions of competence are learned by students in preparation for their roles in the industry and society. Such instruments are Attitudes Toward Computer Technologies (ACT) and Self-Efficacy for Computer Technologies (SCT) (Delcourt & Kinzie, 1993), Computer Anxiety Index (Maurer, 1983), .Teaching Effectiveness And Evaluation Survey (Ogunyemi & Ikegulu, 1998), Attitudes Toward Computer (Raub, 1981), and Computer Attitude Scale (Loyd & Gressard, 1984). Each of these instruments has been widely researched in education. All have acceptable psychometric properties, including reliability and validity.

Operationally, 'cognitive learning styles' are the preferred ways learners adapt to learning new information and skills; a pattern of information absorbing, processing, and regurgitating of anchored information stored in the student's reservoir of learned materials (Ikegulu, 1997). Learning styles is an array of socio-cultural, linguistic, experiential, and educational factors that influence the way diverse students learn (Burkhalter & Schaer, 1985; Davis, 1999; Henderson & Landesman, 1995; Messick, 1976).

Course Satisfaction and Academic Achievement

The relationship between post-course students' attitude and the specific faculty behaviors and class characteristics that explain attitude is unclear. Khan and Weiss (1973) reviewed research literature related to this phenomenon and concluded that results render it difficult to piece together the types of educational experiences that are most likely to promote desirable affective responses. Despite this fact, institutional faculty and instructional designers continue to espouse the

importance of students' attitudes as a criterion of effective instruction (Ikegulu, 1997; Kelly & Chapman, 1977). Even when the problems involved in obtaining reliable and valid measures can be largely overcome, instructional developers and instructors are still likely to be frustrated in their efforts to relate measures of student attitude to observable aspects of course design or instructors' and students' classroom behaviors (Davis, 1999; Ogunyemi & Ikegulu, 1998).

While it is well known that factors other than instructors' teaching methods influence students' ratings of instruction, not all the sources of influence have been identified. Students' gender, expected course grades, perception of their instructors' classroom attitudes, subject-matter content, age, rank, and instructional experience (presentation, clarity of objectives, choice of media, grading style, charisma, and enthusiasm) are some of the covariates in students' overall evaluation ratings of their instructors (Ogunyemi & Ikegulu, 1998).

A body of research shows that students perceive female instructors as less competent than their male counterparts with comparable age, rank, qualification, and longevity (Bray & Howard, 1980; Etnaugh & Rose, 1975; Ferber & Huber, 1975); and that the college teaching profession is a male-oriented establishment (Auster, 1989; Davis & Sauser, 1993; McShane, 1990). Results of studies investigating instructors' evaluation at the postsecondary level have been inconsistent. Precious studies (e.g., Centra, 1979; Doyle, 1975; Feldman, 1977) indicated that gender has little impact on instructors' evaluation rating scores. Other studies such as Abrami (1989), Basow and Howe (1982), Branch (1994), Bray and Howard (1980), Cashin and Downey (1992), Feldman (1983, 1988/89, 1992/93), and Harris (1975) suggested that a gender difference may exist and, female instructors receive better ratings than male instructors.

In the presence of bias, at least two postulates attempt to explain the bias. Ogunyemi and Ikegulu (1998) used 'teaching effectiveness, evaluation, and students' expected course grades' to posit that students' preferred faculty who are learner-centered and employed the instructional design principles (conducting analysis or determining objectives, synthesizing and delivering their instruction, and evaluating their students based on their instruction) in their classrooms. Abrami, Dickens, Perry, and Leventhal (1980) used 'grade leniency and grading standards' to argue that better students' ratings could be attributed to the instructors' grading standards. O'Connell and Dickinson (1993) used 'perceived knowledge gains' to infer that students' global ratings could be seen as a function of testing conditions and perception of amount learned; and that the mean rating scores were gender independent. Taynor and Deaux (1973) applied the 'equity model' to argue that women would be seen as more deserving of reward than men for a comparable performance due to the male dominant postsecondary institutional environments. The contention that guided the equity model was that female instructors tend to show more warmth and expressiveness; and were more empathetic and charismatic in classroom settings than male instructors. More research studies are needed concerning another possible explanation, Teacher Planning Routines in classroom instruction: instructors' characteristics (age, gender, length of service or longevity, seniority or rank, average semester or quarter credit load, and his or her practice of instructional design processes in classroom (Branch, 1992, 1994; Branch, Darwazeh, & El-Hindi, 1991, 1992; Ogunyemi & Ikegulu, 1998). The assumption underlying the teacher planning routines is that most instructors generally engage in instructional design practices: determining course goals, breaking down curriculum goals into learning tasks, organizing the content of each lesson around a central

theme, and making sure the lesson fits the entire curriculum (Branch, 1994).

Theoretical and Pragmatic Frameworks

The literature on the relationships between computer anxiety-apprehension, computer attitude, and students' scholastic achievement and their course satisfaction can hardly be considered encouraging. Evidence abounds on general and state anxiety and on computer anxiety-apprehension and their correlates. After several decades of research, most widely recognized measures of computer anxiety, apprehension, attitude, and self-efficacy have been found to correlate with academic achievement only in an inconsistent manner, and even then, the correlation never exceeded 0.25 (Davis, 1999; Knowles, 1973; Ross, et al., 1993). While there are many reasons for the lack of substantial and consistent relationships in the education literature, one potential explanation is the almost exclusive reliance on the assessment of computer anxiety-apprehension which operationalized anxiety traits as generalized dispositions rather than situational dispositions. Operationally, this means that measures of computer anxiety-apprehension and computer attitude have been developed to apply across many situations rather than in single situations and/or content. This dissertation study will focus on three broad dimensions in educational settings. Specifically, these dimensions are computer anxiety, computer apprehension, and computer attitudes. These dimensions are usually discussed within the pedagogical underpinnings of instructional and/or classroom anxiety as they relate to communication and writing apprehension and anxiety; and general and state anxiety as they relate to computer anxiety-apprehension, academic achievement, and course satisfaction.

Pedagogical Roots of Anxiety and Apprehension

The present investigation focused on two narrower dimensions of computer utility in an instructional environment: (1) computer anxiety-apprehension and (2) computer attitude. Both dimensions are discussed within the theoretical frameworks of instructional and/or classroom anxiety as they relate to communication and writing apprehension and anxiety; and general and state anxiety as they relate to computer anxiety-apprehension, academic achievement, and course satisfaction.

Communication and Writing Anxiety and Apprehension.

Computer Science and mathematics are not the only disciplines to recognize anxiety and its detrimental effects on students' performance. Anxiety and apprehension have plagued students' written composition and essays for the past six decades. Within the past four decades, a number of investigators in the field of speech communication have examined the role of anxiety and apprehension as they relate to interpersonal communication and human interaction. The conclusion from these investigations is that communication apprehension is a pervasive trait that seriously affects a large number of individuals (Clavenger, 1974; Heston & Paterline, 1974; Phillips & Metzger, 1973; Wheeless, 1974).

Phillips (1968) offered the best definition of this phobia. The highly apprehensive individuals are those for whom anxiety about communication out-weighs their projection of gains from such situations. That is, the highly apprehensive individuals have the tendency to avoid communication situations or react in some anxious manner if compelled because they foresee primarily negative consequences from such engagements. Specific research findings have indicated

that highly apprehensive individuals have the potential to be less motivated to achieve (Giffin & Gilham, 1971) and generally engage in less self-disclosure (Hamilton, 1972). Furthermore, they also tend to select occupations that they perceive to have minimum communication (Daly & Shamos, 1976, 1978), as well as, chose housing and seating positions that require less communication. High communication apprehensives seldom engage in group dynamics; and when forced to, contribute very little to the group (Daly, 1981; Daly & Shamos, 1976, 1978). As one would expect, research has also demonstrated that individuals who have such apprehension tend to exhibit low self-concept (Johnson, 1973), which in turn is often reflected and reinforced by those they interact with; and receive lower ratings in groups and on both credibility and interpersonal relations (Karst & Most, 1973).

Writing is one of the means of communication and has been of national concern, particularly since the writing skills of students have diminished. The decline in college students' writing quality can be attributed to the presence of communication apprehension and the absence of verbal precision in television, advertising, and political language. It is also due to the lack of writing practice in high school English courses, underprepared English Teachers, and the difficulties involved in evaluating students' writing. In addition, writing instructors who revealed a decrease in the writing skills of entering freshmen indicated that students had decreased in communication of logical ideas, development and construction of mature and grammatical sentences, spelling, organization and coherence of the total composition, and punctuation. (Cullum, 1991; Daly, 1978c; Daly & Shamos, 1978; Hayes, 1981).

For the past 30 years, the psychosocial construct writing apprehension has been of

particular interest to researchers, writing instructors, and educators at-large. Consequently, an abundance of empirical studies have examined writing apprehension to determine its impact on the writing skills of students. Studies have revealed that writing anxiety is a consequence of high writing apprehension. John Daly, one of the major proponents leading the field of research on writing apprehension, is responsible for coining the term writing apprehension: "A situation and subject specific individual difference associated with a person's tendencies to approach or avoid situations perceived to potentially require writing accompanied by some amount of perceived evaluation" (Daly, 1981, p. 10).

With regards to writing, students are labeled as either high or low apprehensives. High apprehensives tend to find writing unrewarding and punishing while low apprehensives find it rewarding and enjoyable. More specifically, high apprehensives tend to avoid situations requiring writing, which to a large extent reduces their opportunities for practice which is crucial to the development of writing skills. In general, high apprehensives perform lower on standardized tests of writing skills and abilities than do low apprehensives; and are less likely to succeed in a variety of academic subject areas than their low apprehensive counterparts. While low apprehensives write more and use more qualifications, high apprehensives tend to write less, use fewer qualifications, usually choose a lower level of vocabulary, and lack creativity .

Literature abounds on the relationships of writing apprehension to self-esteem (Daly, 1977, 1978c); message intensity, sex differences, and SAT scores (Daly & Miller, 1975c; Daly & Shamos, 1976); success expectations, and willingness to take advanced courses (Daly & Miller, 1975b, 1975c; Daly & Shamos, 1976); and academic and occupational choices, decisions, and

preferences (Daly & Shamos, 1976, 1978). However, much of the research has focused on writing apprehension and students' writing performance in terms of writing aptitude, writing ability, and language intensity (Clifford, 1981; Faigley, Daly & Witte, 1981; Hayes, 1981). Few of these studies were devoted to writing apprehension and anxiety.

Anxiety about writing is perhaps the most common form of writing deficit that both experienced and inexperienced students will encounter when composing. The causes of writing anxiety vary from neurological problems that underlie language processing, poor skill development, and inadequate role models to lack of an understanding of the composing process and an authoritative, teacher-centered, product-based mode of teaching. Overall, researchers argue that writing anxiety stems from a student's previous academic success. Although the symptoms are all too familiar, a number of studies have examined the causes and predictable effects of writing anxiety in order to help improve the writing skills of college students (Clifford, 1978, 1981; Connors & Lunsford, 1993; Schultz & Meyers, 1981; Shrewsbury, 1995).

General and State Anxiety.

Contemporary anxiety theory and research have maintained that anxiety is a multifaceted emotion that has the potential to disrupt cognitive and metamemorial activities at several stages of information formation and processing.

Anxiety may affect test performance (and ability) by interfering with test preparation and study habits. Students who are generally anxious about taking a test may fail to use appropriate test-taking strategies and study skills to: (1) direct their attention to relevant information, (2) integrate information in memory, (3) assess their learning state through some form of self-

evaluation, and (4) believe in their mental models (Guller & Holahen, 1980; McKeachie, Pintrich, & Lin, 1985). Another theoretical account of the relationship between anxiety-apprehension and performance proposes that anxiety-apprehension interferes with cognitive activities at the time of the evaluation. Anxious students may become preoccupied with, be apprehensive, and/or worry about their performance and these intrusive thoughts may undermine the students' self-esteem, interfering with their ability to sustain attention to task-relevant instructional materials; thereby, preventing the students from engaging in cognitive operations (e.g., use of a variety of logical rules and recall)that would facilitate test performance (Deffenbacher, 1982; Sarason, 1985).

Students' Academic Achievement and Course Satisfaction

Evidence abounds in the literature that suggests a preference for global to single ratings of faculty evaluation scores. Cashin and Downey (1992) stressed that a multidimensional global student rating system is better than a single item one for summative faculty evaluation. Kinney and Smith (1992) proposed an empirically derived 'instructor-student' model to argue that an instructor's aggregate evaluation score could be modeled as a function of the course, instruction, and the student; and that students' rating of an instructor's competence was a reliable measure. Feldman's (1988) reviews of previous studies indicated that the correlations between specific and global evaluation ratings of college instructors reflected the pragmatic importance of various specific instructional assessment of these instructors:

> "The teacher's preparation and organization, clarity and understandableness, and sensitivity to, and concern with, class level and progress are of special importance in all three ways.

> That is, students and faculty view them as highly important when asked about the components of good teaching, and they are of high importance in discriminating among the global ratings received by teachers from their students" (Feldman, 1988, p. 316).

Studies of teacher planning routines have consistently revealed that instructors do not follow the objective-oriented planning model proposed by Reigeluth (1983) and Tyler (1969). Instead they concentrate on selecting or designing instructional activities that focus on the instructional content (Clark & Peterson, 1986; O'Connell & Dickinson, 1993). This approach runs counter with the general principles of instructional design (Anglin, 1995; Branch, 1992; Dick & Carey, 1996; Gentry, 1993; Heinich, Molenda, Russell, & Smaldino, 1996; Reigeluth, 1983; Smith & Ragan, 1992). Instructional design is a planning process for addressing the multiple backgrounds of the learners, the multiple interactions between the content, media, instructor, and the learner, and the multiple instructional contexts for a specified period of time (Branch, 1994, p. 26).

Designing, developing, testing, implementing, and evaluating instructional episodes require analysis and assessment of all the instructional design components: Task Analysis, analysis of the learners and the instruction; Instructional Objectives, determining the instructional goals and objectives; Instructional Synthesis, sequencing and delivering the instruction to the target audience, formatting the instructional content, and selecting appropriate media around the learners; and Instructional Evaluation, formative and/or summative evaluation of the learners, instruction, and the instructors in such a way that learners' evaluation by the instructors are centered around the content and the curriculum. Each of these components are rooted in learning theories and are

founded on heuristic and empirical findings from research studies.

An instructional theory depends on its 'parent' learning theory or a combination of other learning theories. Learning is a permanent change in behavior. Learning is context sensitive, 'in situ' dependent, content or domain specific, cognitively draining, and technology-driven (Driscoll, 1994; Gagne', 1985; Ikegulu, 1997; Ogunyemi & Ikegulu, 1998; Reigeluth, 1983). Instruction, however, is the identification of methods that best provide conditions under which learning goals and outcomes are most likely to be attained; and is curricula-driven (Branch, 1994; Heinich, et al., 1996).

Teacher planning routines include the thought processes that instructors engage in, before and after the classroom instruction, which then guide their subsequent classroom interaction and instructional sequencing (Branch, 1992, 1994; Branch, et al., 1991/92). The teacher planning routines have been posited to be influenced by instructors' characteristics such as age, gender, longevity, rank, and credit load. Research studies (e.g., Branch, 1994; Cashin & Downey, 1992; Clark & Peterson, 1986; Elmore & LaPointe, 1974, 1975; Feldman, 1993, 1992, 1983; Kinney & Smith, 1992; Wheeless & Potori, 1989) that focused on instructors' characteristics had shown some interesting results between instructors' age, rank, instructional experience, and gender and, students' academic achievement.

Marsh and Roche (1993) evaluated the effectiveness of students' evaluation ratings of instructors' effectiveness as a means for enhancing teaching in higher education. They constructed a teacher-rated importance weighted average of the Student Evaluation of Educational Quality (SEEQ) dimensions to arrive at an overall evaluation score. Components (factors or constructs) in

the SEEQ are Amount Learned, Group Interaction, Enthusiasm, Organization, Individual Rapport, Breadth of Coverage, Examination Fairness, Assignments, and Course Difficulty. Results of their analysis indicated that: (1) Amount Learned was consistently the most important factor affecting overall evaluation. (2) Course Difficulty was consistently the least important factor that affected overall evaluation. (3) There was a strong similarity among these nine factors in the SEEQ and between the instructors' and the students' perceptions of effective teaching.

Validation is the most critical step in item construction because it is the process by which summated survey items take on meaning based upon the participants' perception of their observed or true feelings about their instructional environments. That is, one does not validate an item per se, but what is validated is the interpretation of (the inherent perception) the item mean scores derived from the survey instrument (Benson, 1998, p. 10). Hence, one study does not validate or fail to validate the scores or composites from a particular construct. Several studies may be required , utilizing different samples or populations (or sub-samples within a particular population of interest) to build a knowledge base to support the evidence of the inherently perceived instructors'; attitudes, teaching effectiveness, and effective use of systems design principles in their classrooms.

Instructors' effective use of systems design principles, as used in this study, is a construct that comprised four composites deemed necessary in the discipline. A construct, therefore, represents an abstract variable (latent unobservable) derived from observations -- theoretically or empirically established -- that defined the characteristics of the observed phenomena (Barham & Ikegulu, 1998) and Ikegulu (1998) defined a construct as an "attribute sensing" latent dimension

that is either unidimensional or multidimensional. It is the attribute about which we want to make an interpretation and inference based upon the survey items and the respondents' responses to the items concerning the construct. For example, the attribute of interest might be the instructors' teaching effectiveness, grading style, charisma and enthusiasm, or instructional delivery and sequencing as measured by their corresponding survey items.

The process by which these survey items (indicators) and their respective construct validation is similar to how scientific inquiries and theories are developed and evaluated. Starting with the observed indicators and information siphoned into the system (from the students' background information) and previous research studies, a theory is formulated. The relationships among the focal construct and other constructs are described; whereafter, inferences are generalized from the sample to the target population. This set of relationships is referred to as a "nomological network of lawful relations" (Ogunyemi & Ikegulu, 1998). Hypothesis involving the constructs within the nomological networks are generated and tested for consistency (internal validity) and reproducibility (external validity). Rival hypotheses could also be proposed in an attempt to explain and justify the observed and/or perceived behavior.

Duncan, Duncan, and Fuzhong (1998) suggested that when positive results are obtained from previous studies conducted in the formative stage, evidence of the necessity conditions for establishing construct validity has been made. However, this necessity condition does not imply that the sufficiency criteria will follow. When the hypothesized construct-indicator relationships are empirically supported (e.g., Branch, 1994; Ikegulu, 1998; Ogunyemi & Ikegulu, 1998), we only know that something is being measured; but what that "something" is still a puzzle to all

psychometricians and instructional designers. In essence, the construct instructors' effective use of systems design principles' are the perceptual evaluation of their instructors' classroom behavior and teaching effectiveness.

The college classroom lies in the center of all educational activities and is structured to accommodate both the instructors and the students in a cybernetic way to effect learning. The conducive nature of the classroom makes it a major feature of students' educational experiences. Indeed, for students who commit to college, especially those who have multiple obligations outside the institutional environment, the classroom may be the only place where students and faculty meet, where education in the formal sense is experienced. For these students, the classroom is the nexus where the social and academic interactions converge; and the venue where their educational contracts are satisfied to effect changes in their attrition-retention behaviors.

Surprisingly, the classroom has not played a major role in current theories of students' persistence. The lack of the classroom interaction in college students' persistence studies is the basis upon which the conceptual framework for this study was formulated. In general, the greater the students' involvement in classroom related activities, the greater their acquisitions of knowledge and development skills. Student-faculty and peer-group interactions (both outside and inside the classroom) are important in shaping students' institutional affiliation and socio-academic integration (Astin, 1993; Endo & Harpel, 1982).

Instructors' Characteristics and Attitudes

Research studies focusing on instructors characteristics had shown significant relationships between instructors' characteristics and students' academic achievements. These findings are more

interesting when the relationships are summarized by type of institution (two- and four-year) and by developmental education status.

Noe (1986) reported that students entering community colleges are less well prepared. Additionally, she believed that community colleges can have more instructors with terminal degrees because of an over abundance of such applicants. However, having the terminal degree does not equate with the knowledge and skills needed to effectively work with developmental learners. More than 50 percent of the faculty at community colleges hold only the B.A. degree (Murphy, 1979; Roueche, Baker, & Roueche, 1984; Noe, 1986; Roueche & Roueche, 1993; Boylan & Bonham, 1994). The same conclusions were reached by Boylan, Bonham and Bliss (1994), from their national study of developmental education. It appeared that the postsecondary student with the greatest need interacts with the least qualified instructor. Is this the reason for more student attrition at postsecondary institutions? There is a need for research that can provide insight as to what type of skills and knowledge teachers should have, and be able to do, to successfully work with developmental students.

The objective of Pascale's (1979) study was to determine experimentally if knowledge of final grade would have an effect on how students evaluated the course and the instruction. 54 students were randomly assigned to two groups. One group had the objective final exam graded in class and received course grades before filling out the end of course evaluation form. The other group filled out the end of course evaluation form before receiving their course grades. The chi-square statistics was used to compare the ratings of the two groups on each of the 18 course evaluation items. Non significant statistical results indicated that knowledge of final grades had no

effect on end of course evaluation and faculty ratings. Results of this study differ significantly with Ogunyemi and Ikegulu's (1998), Davis' (1999), and Barham and Ikegulu's (2000) studies.

The essential purpose of Ogunyemi and Ikegulu's (1998) study was to examine the differential effects of gender and expected course grade on faculty evaluation. The participants were 380 undergraduate and graduate students and 18 instructors who voluntarily agreed to participate by signing the Consent Forms. Collected data were subjected to univariate ANOVA and multivariate statistical techniques of MANOVA and discriminant analysis. Analyses found the following results: male students consistently rated male instructors higher (and female instructors lower) than female students; the expected course grades reported by students significantly influenced their evaluation ratings; and female students gave lower ratings than male students. These ratings were consistent even when the factor-based teacher planning routines (TPR) were considered.

When added to a discriminant analysis based on the four factorially derived scales, several trends were noted: (1) The discriminant analysis identified three distinct functions that described students' global perceptions of their instructors' attitudes and teaching effectiveness. About 64.6%, 29.6%, and 8.6% of the students who expected to earn an "A, a B, and a C" respectively were predicted to rate their instructors low and actually rated them low; and 69.7% of the students who expected to earn a "D" were predicted to rate their instructors high gave them higher ratings. These functions explained about 59% of the total variance in the factor-based TPR faculty evaluation and, correctly classified 47.89% of the students in their respective course grades. (2) Students preferred a student-centered instruction and instructors who were student-oriented, placed

emphases on students' background characteristics, determined course objectives and prerequisite skills, presented the instructional materials at the students' level of understanding, and evaluated both the instruction and the students, to faculty-controlled instruction and instructors with minimum instructional experience. (3) The order of preference espoused by the students with regards to the TPR and the Teacher Effectiveness and Evaluation Survey items were Conducting Analysis, Instructional Objectives, Evaluation, and Synthesis.

A body of research shows that students perceive female instructors as less competent than their male counterparts with comparable age, rank, qualification, and longevity (Bray & Howard, 1980; Etaugh & Rose, 1975); and that the college teaching profession is a male-oriented establishment (Auster, 1989; Davis & Sauser, 1993; McShane, 1990). Results of studies investigating instructors' evaluation at the postsecondary level have been inconsistent. Studies (e.g., Doyle, 1975; Feldman, 1977; Centra, 1979; Pascale, 1979) indicated that gender has little impact on instructors' evaluation ratings. Other studies, such as Branch (1994), Bray and Howard (1980), Feldman (1983, 1989), Cashin and Downey (1992), and Harris (1975) suggested that a gender difference may exist, and female instructors receive better ratings than male instructors. Further research studies have shown that the gender of the student may bias the ratings, with female students giving better ratings than male students (Abrami, 1989; Basow & Howe, 1982; Ferber & Huber, 1975; Ogunyemi & Ikegulu, 1998; Pascale, 1979).

When bias has been found, at least two postulates attempt to explain the bias. O'Connell and Dickinson (1993) used 'perceived knowledge gains' to infer that students' global evaluation ratings could be seen as a function of testing conditions and perception of amount learned; and that

the mean rating scores were gender independent. Abrami, Dickens, Perry, and Leventhal (1980) used the `grade leniency and grading standards' to argue that better students' ratings could be attributed to the instructors' grading standards. Taynor and Deaux (1973) applied the `equity model' to rationalize that women would be seen as more deserving of reward than men for a comparable performance due to the male dominant postsecondary institutional environments. The contention that guides the equity model is that female instructors show more warmth and expressiveness; and are more empathetic and charismatic in classroom settings than male instructors. More research studies are needed concerning another possible explanation, 'Teacher Planning Routines' (TPR) in classroom instruction: instructors' characteristics (age, gender, length of service or longevity, seniority or rank, average semester or quarter credit load, and his or her practice of instructional design processes in classroom (Branch, 1992, 1994; Branch, Darwazeh, & El-Hindi, 1991, 1992). The assumption under the TPR is that most instructors generally engage in instructional design practices: determining course goals, breaking down curriculum goals into learning tasks, organizing the content of each lesson around a central theme, and making sure the lesson fits the entire curriculum (Branch, 1994).

One common complaint offered by developmental students who do poorly in college is that they experience high levels of state and/or test anxiety which impairs their ability to perform well when evaluated (Ikegulu, 1998; Barham & Ikegulu, 2000).The theoretical framework for the Barham and Ikegulu's (2000) study revolved around two interrelated theories: Study-Skills Deficit and Cognitive-Attentional Interference. Both theories are often discussed under the pragmatic frameworks of the Deficiency and General Test Anxiety and, the Interference and State Anxiety

models (Cavallaro & Meyers, 1986; Dendato & Diener, 1986; Holahan, 1980; McKeachie, Pintrich, & Lin, 1985).

Two hypotheses were proposed: (1) Females would not be significant different than males in their academic performance, mean persistence time, and persistence distribution. (2) First-generation and non-first-generation developmental students would be significantly different in their academic performance, mean persistence times, and persistence distributions. The "Mathematics Anxiety-Apprehension Survey" was administered to students in twelve classes differing in composition and content. The product limit Kaplan-Meier (1951) estimator was employed to estimate the persistence distributions for the sample. Low mathematics anxiety was consistently related to high academic performance and the likelihood to persist in college. In all comparisons, gender was significant but first-generation status was not.

Methodology and Analytical Procedures

Similar to the first preliminary study, a 2 X 3 X 2 factorial design was used to analyze the collected data (Davis, 1999). This design is suitable for this type of study because it allowed me to focus on the differential main and possible interaction effects of the fixed factors gender (male and female), computer attitude (low and high), and cognitive styles of field dependence status (FI, FN, and FD) on the outcome measure students' course satisfaction (as measured by the students' overall scores on their Teaching Effectiveness and Evaluation Survey [Davis, 1999]). The models considered are given by (Burkhalter & Schaer, 1985; Davis, 1999; Neter, et al., 1989):

$$Y^{*}_{ijkr} = \mu__ + \alpha_i + \beta_j + \varphi_k + \alpha\beta_{ij} + \alpha\varphi_{ik} + \beta\varphi_{jk} + \alpha\beta\varphi_{ijk} + \epsilon_{ijkr};$$

where,

Y^{*}_{ijklr} = The Teaching Effectiveness and Evaluation Survey score (r = 1, , 3, ..., N).

$\mu_{___}$ = The grand mend of the dependent outcome under consideration.

α_i = The cognitive learning style main effect (I = 1, 2, & 3).

β_j = The gender main effect (j = 1 & 2).

φ_k = The computer attitude main effect (k = 1& 2; l = 1, 2, & 3).

$\alpha\varphi_{ik}$ = The cognitive learning style-by-computer attitude interaction term.

$\alpha\beta_{ij}$ = The cognitive learning style-by-gender interaction term.

$\beta\varphi_{jk}$ = The gender-by-computer attitude interaction term.

$\alpha\beta\varphi_{ijk}$ = The cognitive learning styles-by-gender-by-computer attitude interaction term.

ϵ_{ijklr} = The error term.

Research Questions and Hypotheses

This preliminary study focused on the following research issues: (1) the differential effects of computer attitude (low and high) and students' course satisfaction with respect to gender; (2) the differential effects of gender on course satisfaction of students classified as low and high in their computer attitude; and (3) the differential effects on the course satisfaction of students classified as field-dependent, field-neutral, and field-independent in their cognitive learning styles. The following research questions were addressed:

1. Is there a significant main effect between computer attitude and students' academic achievement and course satisfaction with respect to cognitive learning styles?
2. Is there a significant main effect between computer attitude and students' course

satisfaction with respect to gender?

3. Are there significant main effects between computer attitude and students' course satisfaction with respect to gender and cognitive learning styles?

4. Are there interaction effects in the course satisfaction between the male and the female students classified as field-dependent, field neutral, and field-independent in their cognitive learning styles; and low and high in their computer attitude?

To determine the influence and relationship of utilizing computers (computer based instruction) in a developmental education classroom setting on students' course satisfaction relative to their gender, cognitive learning styles, and their attitude toward computers, the following null hypotheses were examined:

H_{01}: There is no statistically significant difference in the course satisfaction of students' classified as field-dependent, field neutral, and field-independent learners.

H_{02}:. There is a significant main effects between male and female students' course satisfaction.

H_{03}: There are no significant main effects in the students' course satisfaction and their computer attitude in their course satisfaction.

H_{04}: There are no significant interaction effects in the students' course satisfaction among the fixed factor effects of gender, computer attitude, and cognitive learning styles.

H_{05}: There are no significant interaction effects between gender and computer attitude, gender and computer anxiety, computer anxiety and computer attitude, and gender, computer attitude, and computer anxiety in students' academic achievement and course satisfaction.

Results and Discussion

The TEES instrument has a total of 41 indicators. The lower the rating scale, the better the rating score. Summary measures were used to describe the sample characteristics. The sample consisted of 130 (93%) Non-Hispanics; 24 (17.1%) White/Caucasian Americans, 106 (75.7%) African Americans; nine (9, 6.4%) Hispanic Americans; and only one (1, 0.7%) foreign student. The gender distribution were 60 (42.9%) males and 80 (57.1%) females. About 105 (75%) of the sample considered themselves first-generation college students; reported that at least one of their parents (77, 55%) or their siblings (82, 58.6%) did not graduate from college. The majority of these students had at least three people residing in their households (130, 92.9%); came from either a single-parent system (59, 42.1%); and a two-family system with either natural or adopted parents (64, 45.7%) or step-parents (17, 12.1%) family background (Davis, 1999).

Table 1 provides comparisons of the gender, computer anxiety and attitude, cognitive learning styles, and course satisfaction summary measures of the academically related indicator variables. The means (and standard deviation) from Table 3 did show significant differences in these academically related indicators by age. Female students have higher mean high school and college GPAs, are more likely to perform better, are less likely to exhibit lower computer anxiety, and be less satisfied with the than male students. Field-independent students have high mean academic performance; and are more likely to be satisfied than field-neutral and field-dependent students (Davis, 1999).

Table 1

Gender, Computer Anxiety and Attitude, Cognitive Learning Styles, and Course Satisfaction Comparisons among the Academically Related Variables

Indicator Variables	Means and (Standard Deviation)	
	Course Satisfaction	
	Satisfied (N = 85)	Unsatisfied (N = 55)
Students' Age	17.38 (4.28)	17.51(1.12)
High school GPA	2.96 (0.61)	2.93 (0.54)
Academic Achievement (GPA)	2.79 (0.56)	2.88 (0.67)
Academic Performance (Test Score)	74.11 (15.61)	77.38 (16.38)
Course Satisfaction Score (TEES Score)	82.15 (10.64)	155.19 (15.51)
Task Analysis	75.15 (14.08)	158.19 (29.76)
Instructional Objective	81.40 (14.09)	153.01 (20.98)
Instructional Synthesis	87.56 (14.94)	153.81 (20.14)
Instructional Evaluation	79.07 (14.00)	157.92 (17.50)
	Gender	
	Male (N = 60)	Female (N = 80)
Students' Age	17.47 (1.05)	17.40 (1.15)
High school GPA	2.96 (0.60)	3.10 (0.59)
Academic Achievement (GPA)	2.77 (0.61)	2.87 (0.60)
Academic Performance (Test Score)	73.07 (17.28)	77.14 (14.84)
Course Satisfaction Score (TEES Score)	106.58 (37.96)	114.25 (38.17)
Task Analysis	104.00 (43.48)	110.60 (47.96)
Instructional Objective	104.98 (38.35)	112.94 (39.42)
Instructional Synthesis	109.65 (37.56)	116.54 (35.99)
Instructional Evaluation	105.02 (41.20)	113.81 (41.77)

Table 1 (Continued)

Table 1 (Continues)

Gender, Computer Anxiety and Attitude, Cognitive Learning Styles, and Course Satisfaction Comparisons among the Academically Related Variables

Indicator Variables	Means and (Standard Deviation)		
	Cognitive Learning Styles		
	Dependent (N = 42)	Neutral (N = 56)	Independent (N = 42)
Students' Age	17.48 (1.02)	17.28 (1.16)	17.57 (1.13)
High school GPA	2.36 (0.65)	2.50 (0.59)	2.83 (0.56)
Academic Achievement (GPA)	2.37 (0.51)	2.69 (0.30)	2.82 (0.45)
Academic Performance (Test Score)	55.74 (10.17)	78.88 (6.38)	90.40 (6.18)
Course Satisfaction Score	104.55 (35.35)	114.09 (41.90)	113.21 (35.55)
Task Analysis	99.18 (41.21)	109.53 (47.88)	114.02 (47.91)
Instructional Objective	104.45 (34.68)	113.02 (44.62)	109.94 (35.29)
Instructional Synthesis	108.23 (35.33)	115.73 (39.24)	116.10 (34.79)
Instructional Evaluation	102.43 (38.83)	114.61 (45.64)	111.59 (38.43)
	Computer Attitude		
	Low (N = 73)	High (N = 67)	
Students' Age	17.45 (1.12)	17.40 (1.10)	
High school GPA	2.87 (0.60)	2.88 (0.59)	
Academic Achievement (GPA)	2.81 (0.58)	2.84 (0.63)	
Academic Performance (Test Score)	76.08 (16.42)	74.64 (15.62)	
Course Satisfaction Score (TEES Score)	112.07 (36.45)	109.76 (40.12)	
Task Analysis	111.77 (45.50)	103.42 (46.58)	
Instructional Objective	109.24 (35.23)	109.84 (43.05)	
Instructional Synthesis	113.64 (33.77)	113.54 (39.90)	
Instructional Evaluation	112.11 (41.41)	107.80 (42.02)	

A principal component factor analysis with maximum variance (VARIMAX) rotation of the 41 items in the TEES instrument revealed four basic factors which were labeled Task Analysis (ANALYST), Instructional Objective (OBJETIVE), Instructional Synthesis (SYNTHESIS), and Instructional Evaluation (EVALUATE). All items on the TEES instrument which loaded at or above a 0.5 criterion were included in their respective factors. Items relating to Instructional Evaluation had an eigenvalue of 10.39 and accounted for 25.35% of the total variance. The second through the fourth factors had eigenvalues and percent of variance as follows: Instructional Objectives, 6.44 and 15.71%; Instructional Synthesis, 5.67 and 13.82%; and Task Analysis, 3.43 and 8.35%. Thus, these four factors accounted for 63.24% of the total variance in students' overall satisfaction with their course and instructors' teaching effectiveness. Table 2 summarizes these factor loadings, estimate scale means (and standard deviations), and the reliability coefficients after the VARIMAX rotation. These results are consistent with Ogunyemi and Ikegulu's (1998) study where they found the overall (global) reliability estimate to be 0.9792; indicating that about 96% of the total variation in instructor's teaching effectiveness and evaluation was explained by students' perceptions of their instructors' teaching effectiveness.

A 2 (gender of participant)-by- 3 (cognitive learning styles)-by- 2 computer attitude analysis of variance with course satisfaction as the outcome variable and gender, computer attitude, and cognitive learning styles as the fixed factor effects revealed a significant global mean course satisfaction, ($F(12, 128) = 101.46$, $p < 0.001$); gender main effect, ($F(1, 128) = 11.05$, $p < 0.01$); computer attitude ($F(1, 128) = 8.54$, $p < 0.05$); and cognitive learning styles ($F(2, 128) = 31.45$, $p < 0.01$). None of the interaction effects were found to be significant. Overall, male (Mean

Table 2

Reliability Estimates, Scale Means and Standard Deviations, and Factor Loadings for the TEES Instrument

Variables/Indicators	Alpha[a]	FL[b]
Overall ($\bar{x}$ = 110.96, SD = 38.13)	.9783	
Task Analysis ($\bar{x}$ = 13.14, SD = 5.62)	.9015	
Instructor breaks down goals into learning tasks.		.8139
Instructor determines minimum skills required of students to complete the course.		.7831
Instructor determines goals based on curriculum.		.7662
Instructor determines the abilities, background, needs, and attitudes of students in the class.		.7336
Instructor determines the course content in order to organize the curriculum.		.7076
Instructional Objectives ($\bar{x}$ = 21.37, SD = 7.61)	.8931	
The prerequisites to the course are outlined.		.8706
The corerequisites to the course are clearly stated.		.8495
The purpose of the course is clearly stated.		.8250
The course objectives are clearly stated.		.7857
Students' course expectations are clearly stated.		.7782
Instructor identifies important points in the course.		.7742
The content of the syllabus is adequate and relevant.		.6934
Lectures are relevant to the course objectives.		.6631
Instructional Synthesis ($\bar{x}$ = 41.56, SD = 13.43)	.9333	
Instructor uses teaching aids for this course.		.8943
Course assignments are interesting and stimulating.		.8895
Instructor has an effective style of presentation.		.8520
Instructor explains course materials clearly.		.8736
Instructor speaks audibly and clearly.		.8682
Instructor displays enthusiasm when teaching.		.7911
Instructor matches students' abilities with lectures.		.7869
The current lesson is related to previous lessons.		.7736
Instructor uses of examples and illustrations.		.7486
Course builds on concepts, procedures, and principles.		.6982
Instructor provides immediate feedbacks to students.		.6961
Instructor has a clear understanding of the course.		.6457
Class lectures contain current information.		.5957
Class size is adequate for in-class interaction.		.5535
There is enough time for questions and discussions.		.5451

(Table 2 Continued)

BEST COPY AVAILABLE

Table 2 (Continued)

Variables/Indicators	Alpha[a]	FL[b]
Instructional Evaluation ($\bar{x}$ = 34.89, SD = 13.19)	.9493	
Instructor respects individual students in the class.		.8853
The instructor is warm and friendly with students.		.8729
The instructor motivates students to do their best work.		.8681
Instructor assigned grades fairly and impartially.		.8567
Quizzes and exams are relevant to the course materials.		.8453
The instructor cares about students in the class.		.8079
Classroom is accessible to all students.		.7985
Students participate in classroom discussions.		.7787
Students are free to ask questions in the class.		.7678
The instructor is qualified to teach the course.		.7505
Instructor's class appearance is appropriate.		.6993
The required textbook is relevant to the course.		.6618
Assignments, exams, & projects are clearly explained.		.5764

Note.
[a] Cronbach's Alpha Reliability Estimates
[b] Factor Loadings

= 106.58, SD = 37.96) were more satisfied with their course than female (Mean = 114.25, SD = 38.17) students. That is, male students consistently gave lower (better) mean rating scores than female students to their instructors. These results were consistent even when the four components of the TEES were included in the analyses. The effect due to instructor was not significant ($F(1, 139) = 1.69$, $p = 0.194$). Furthermore, field-dependent (Mean = 104.55, SD = 35.35) students were more globally satisfied with their instructors and the course than the field-neutral and field-dependent students. The field-neutral (Mean = 114.09, SD = 41.90) and field-independent (Mean = 113.21, SD = 35.55) students were not differentially dissatisfied with their instructors and the

BEST COPY AVAILABLE

course. Students with high computer attitude (Mean = 109.76, SD = 40.12) were more satisfied with their instructors and the course than the low attitudinal (Mean = 112.07, SD = 36.45) students.

Summary and Conclusion

The TEES instrument used in this investigation had a total of 41 indicators. The lower the rating scale, the better the rating score. The highest possible score for any of the 41 items was 5; and the minimum and maximum scores were 41 and 205. The overall mean, standard deviation, and median score for the entire sample were 110.96, 38.13, and 91.0 respectively. Overall, of the 85 (60.7%) students who were satisfied with their instructors and the course, their mean (SD) and median satisfaction scores were 82.15 (10.64) and 82.0; and for the 55 (39.3%) unsatisfied students, their mean (SD) and median satisfaction scores were 155.49 (15.51) and 158.0. Reliability estimates were computed for the 41 items and the four components. The global reliability estimate was 0.9783. This means that about 95.7% of the total variance in students' course satisfaction and instructor's teaching effectiveness was explained by students' perceptions of their instructors' classroom attitudes and teaching effectiveness. The least reliability coefficient (0.8931) was observed for the Instructional Objective component, which implies that about 79.8% of the variance was explained by this factor.

A lower mean satisfaction score indicated that the students were in agreement that the `truth' about the item in question happened "almost always or often" in their classrooms. Consistent with the satisfaction score of the TEES instrument, the computer attitude component of the CAAAS

instrument also indicated a global concordance in students computer attitude. A higher global mean computer attitude score indicated that the students were in disagreement that their 'true feeling' about the items reflected their level of computer attitude. Contrary to my expectations and the proposed hypotheses, the analyses did not reveal that male students rated their instructors and were generally dissatisfied with their course. Instead, this pilot study found three significant results: (1) There was a significant gender effect in students' course satisfaction. Female students consistently rated their instructors higher (worse) than male students. These ratings were consistent even when the four components of the Teacher Effectiveness and Evaluation Survey were considered. (2) There was a significant computer attitude main effect on students' course satisfaction. The insignificance of the instructors' effect was a consequence of how students perceived their instructors' attitudes and teaching effectiveness during classroom instruction. High computer attitude students, on average, rated their instructors better than low computer attitude students. (3) There was also a significant effect due to cognitive learning styles. Field-dependent students were more satisfied with their instructors and the course than the field-neutral and field-independent students. In addition, female students who are field-dependent with high computer attitude are less satisfied with their instructors and the course than the low attitudinal and field-neutral-independent female students; and the male field-dependent students with high computer attitude.

Figures 1, 2, and 3 portray the trend in the factor-based (ANALYST, OBJECTIVE, SYNTHESIS, and EVALUATE) marginal means for the students' course satisfaction by gender,

computer attitude, and cognitive learning styles. Female students consistently scored higher than male students on all the factorially derived course satisfaction scales. Overall, both male and female students had a higher preference for instructional synthesis. Male students tended to have preference for instructional analysis than instructional objective and evaluation. Students with low computer attitude, on the other hand, had more preference for instructional evaluation and analysis than for instructional objective; and both low and high attitudinal students also tended to have the highest preference for instructional synthesis. The concordance in the students' preferences for instructional sequencing could be attributed to their differential distributions within the levels of computer anxiety and computer attitude.

The higher a student's computer attitude, the worse his/her academic performance, academic achievement, and course satisfaction; and the higher his/her level of computer anxiety. Of the 73 low computer attitude students, 12 (16.4%) were low-anxious, 50 (68.5%) were moderate-anxious, and 11 (15.1%) were high-anxious. In addition, of the 67 high attitudinal students, 10 (14.9%) were low-anxious, 48 (71.65%) were moderate-anxious, and nine (9, 13.4% were high-anxious. The disproportionate distribution of the computer anxiety-attitude in the sample indicated that the majority of the students clustered around the moderate computer anxiety category. Female high attitudinal students were more satisfied with their course and instructor than female and male students with high computer attitude.

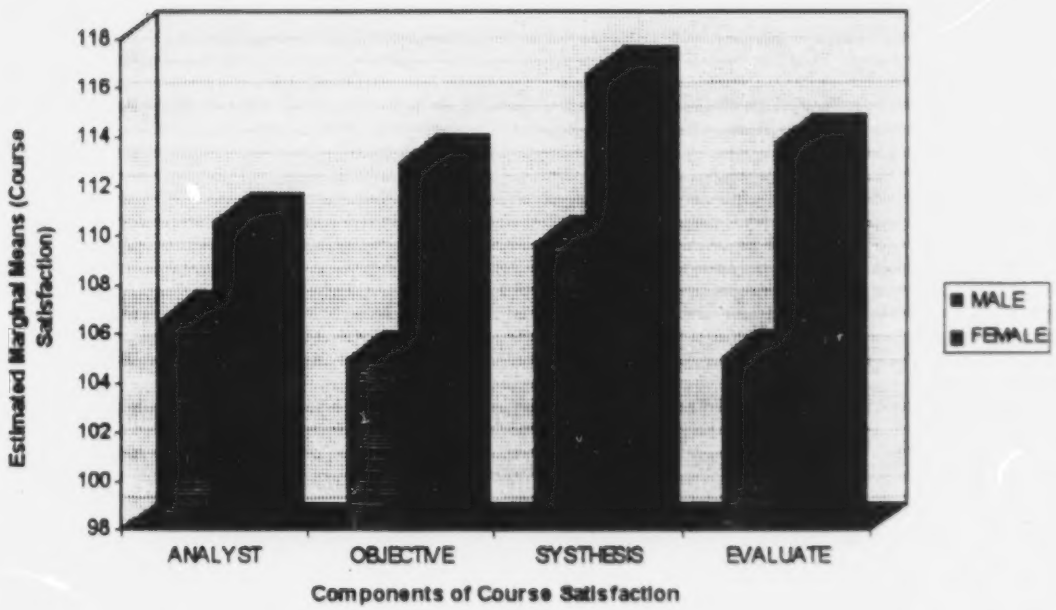

Figure 1

Factor-Based Comparison of Course Satisfaction by Gender

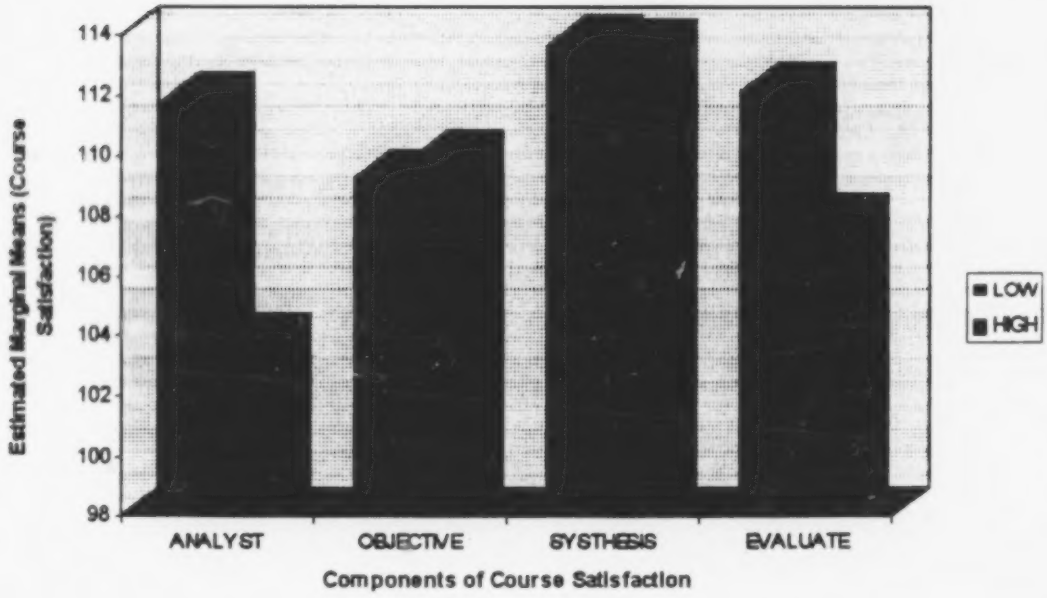

Figure 2

Factor-Based Comparison of Course Satisfaction by Computer Attitude

With regards to cognitive learning styles, the marginal mean course satisfaction for the field-dependent students were consistently lower on all four factor scales than for the field-neutral and field-independent students. Field-neutral students had more preference for instructional objective than field-dependent and field-independent learners. The field-independent students had the highest marginal mean satisfaction score; and had more preference for instructional synthesis,

BEST COPY AVAILABLE

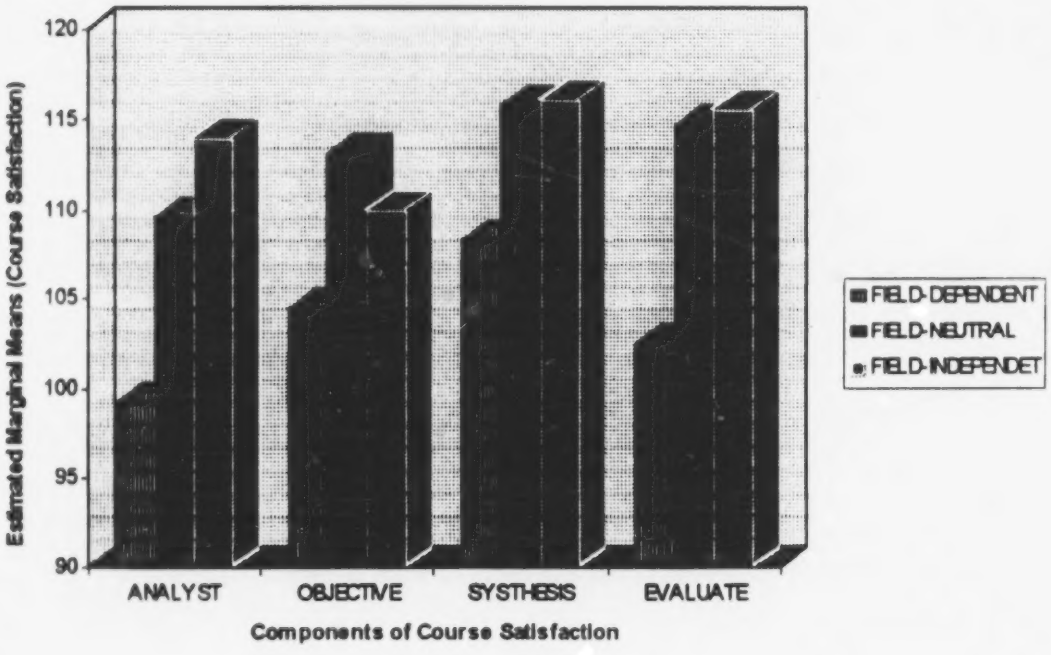

Figure 3

Factor-Based Comparison of Course Satisfaction by Cognitive Learning Styles

instructional evaluation, and instructional analysis than they had for instructional objectives. The field-neutral students, on the other hand, had more preference for instructional synthesis, evaluation, and objectives than they had for instructional analysis. The marginal distribution of the cognitive learning styles in the sample indicated that the majority of the students clustered around the moderate computer anxiety category. The high attitudinal students were more satisfied than the low attitudinal students who were field-dependent, field-neutral, and field-independent learners. The respective distribution of the 42 field-dependent learners included 24 (57.1%) low-attitudinal

and 18 (42.9%) high-attitudinal students. Of the 56 field-neutral learners, 26 (46.4%) and 30 (53.6%) were low-attitudinal and high-attitudinal students; and of the 42 field-independent learners, 23 (54.8%) and 19 (45.2%) were low-attitudinal and high-attitudinal students respectively.

This study did not supports findings from Bem (1974), Bennett (1982), and Ogunyemi and Ikegulu (1998) studies where female students rated female instructors better on evaluation items that described instructors' interpersonal aspects. Interpersonal indicators such as instructors' teaching methods, empathy, charisma, and grading style, may indeed account for gender differences in faculty evaluation (Abrami, et al., 1980; Bem, 1974; Bennett, 1982; Elmore & LaPointe, 1974; Wheeless & Potori, 1989). This type of thinking could work to invalidate students' perceptions of their instructors' teaching effectiveness. However, it could also stand as a test of validity for the teacher planning routines instructors employ in their classrooms. For instance, if instructors want better evaluation ratings, all they have to do is design their instruction to accommodate students' background behaviors. The students' perception of their instructors' teaching effectiveness, a measure of students' course satisfaction used in this study, indicated that the majority of the sample had more preference for instructors who are cognizant of students' background characteristics, deliver their lectures or instruction in a systematic manner, evaluate the students based on the instruction and the course materials, and state the objectives of the course and/or instruction that reflect students' expectations.

While this investigation adds to the empirical support that students' gender, computer attitude, and cognitive learning styles, as well as their global perceptions of their instructors'

classroom instruction affect their course satisfaction and faculty rating, future research endeavors should attempt to link the various components of teacher planning routines with a larger pool of instructors and students. This attempt will solidify the causal links among these variables using either path or covariance structures analyses techniques. Student evaluation of faculty have been found to be valid predictors of teaching effectiveness (Branch, 1992, 1994; Branch, et al., 1991, 1992; Bray & Howard, 1980; Centra, 1974; Doyle, 1975), and should be used in the performance appraisal of instructors in higher education (Ogunyemi & Ikegulu, 1998). When students' ratings are deemed to be important in personnel decisions such as retention and tenure, promotion in rank, and salary adjustments, these variables can be instrumental in maintaining the crucial validity that exists with students' ratings.

References

Abrami, P. C. (1989). How should we use student ratings to evaluate teachers? Research in Higher Education, 30, 221-227.

Abrami, P. C., Dickens, W. J., Perry, R. P., & Leventhal, L. (1980). Do teacher standards for assigning grades affect student evaluations of instruction? Journal of Educational Psychology, 72, 107-118.

Alexander, P. A. & Dochy, F. J. (1995). Conceptions of knowledge and beliefs: A comparison across varying cultures and educational communities. American Educational Research Journal, 32, 413-442.

Alexander, P. A., Kulikowich, J. M., & Jetton, T. L. (1995). Interrelationship of knowledge, interest, and recall: Assessing a model of domain learning. Journal of Educational Psychology, 87, 559-575.

Aspillaga, M. (1991). Screen design: location of information and its affect on learning. Journal of Computer-Based Instruction, 18 (3), 69-92.

Ashton, P. T. & Webb, R. B. (1986). Making a difference: Teachers' sense of efficacy and student achievement. New York: Longman.

Auster, E. R. (1989). Task characteristics as a bridge between macro-and-micro level research on salary inequity between men and women. Academy of Management Review, 14, 173-193.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. Psychological Review, 84, 191-215.

Bandura, A., Adams, N. E., (1977). Analysis of self-efficacy theory of behavioral change. Cognitive Therapy and Research, 1, 287-310.

Bandura, A. Adams, N. E., & Beyer, J. C. (1977). Cognitive processes mediating behavioral change. Journal of Personality and Social Psychology, 35, 125-139.

Barham, W. A. & Ikegulu, T. N. (2000). Effects of Gender and Mathematics Anxiety on Students' Academic Performance and Persistence. Paper presented at the Annual Conference of the National Association for Developmental Educators (Biloxi, Mississippi, March 2000).

Barham, W. A. & Ikegulu, T. N. (1999). The impacts of final course grades on faculty evaluation. Manuscript submitted for publication with the Journal of Research and Teaching in Developmental Education.

Basow, S. A., & Howe, K. G. (1982). Sex bias in evaluations of college professors. Paper presented at the Meeting of the Eastern Psychologist Association. Baltimore, MD.

Bear, G. G., Richards, H. C., & Lancaster, P. (1987). Computer anxiety, computer attitude, and computer self-efficacy. Journal of Educational Computing Research, 3, 207-218.

Bem, S. L. (1974). The measurement of psychological androgyny. Journal of Consulting and Clinical Psychology, 42, 155-162.

Bennett, S. K. (1982). Student perceptions of and expectations for male and female instructors: Evidence relating to the question of gender bias in teaching evaluation. Journal of Educational Psychology, 74, 170-179.

Benshoof, L. A., & Hooper, S. (1993). The effects of single and multiple window presentation on achievement during computer-based instruction. Journal of Computer-Based

Instruction, 20, 113-117.

Bentzen, N. (1974). Changing schools: The magic feather principle. New York: McGraw-Hill.

Billingsley, P. A. (1988). Taking panes: Issues in the design of windowing systems. In M. Helander (Ed.), Handbook of Human-Computer Interaction (pp. 413-436). North-Holland: Elsevier Science Publishers.

Birenbaum, M. & Kraemer, R. (1992). Effects of gender and ethnicity on students; perception of mathematics and language study. Journal of Research and Development in Education, 26(1), 30-36.

Bock, R. D. (1975). Multivariate statistical methods in behavioral research. New York: McGraw Hill.

Bork, A. (1984). Course design: Design considerations. In R. Shostak (Ed.), Computers in Composition Instruction. Eugene, Or: ICCE Publications.

Burke, M., Peterson, C., Segura, D., & Johnson, L. (1992). Computer assisted vs. text based practice: Which method is more effective? Educational Resource Information Center (Document No. ED 350 046).

Bury, K. F., Boyle, J. M., Every, R. J., & Neal, A. S. (1982). Windowing versus scrolling on visual display terminal. Human Factors, 24(4), 385-394.

Branch, R. C. (1994). Common instructional design practices employed by secondary school teachers. Educational Technology, 34(3), 25-34.

Branch, R. C. (1992). Instructional design practices and teacher planning routines. Paper

presented at the Annual Convention of the Association for Educational Communication and Technology,

Branch, R. C., Darwazeh, A., & El-Hindi, A. E. (1992). Instructional design practices and teacher planning routines. In M. R. Simonson & K. Jurasek (Eds.), Proceedings of Selected Research and Development Presentations at the 1992 National Convention of the Association for Educational Communication and Technology (pp. 86-94). Washington, DC: Association for Educational Communication and Technology.

Branch, R. C., Darwazeh, A., & El-Hindi, A. E. (1991). The influence of instructional design practices and teacher planning routines. Paper presented at the Annual Meeting of the Association for Educational Communication and Technology, Orlando, FL.

Bray, J. K., & Howard, G. S. (1980). Interaction of teacher and student sex and sex role orientations and student evaluation of college instruction. Contemporary Educational Psychology, 5, 241-248.

Card, K. S. Pavel, M., & Farrell, J. E. (1984). Window-based computer dialogues. In B. Shackel (Ed.), Human Computer Interaction- INTERACT'84. Amsterdam: Elsevier Science Publishers.

Cashin, W. E. & Downey, R. G. (1992). Using global student rating items for summative evaluation. Journal of Educational Psychology, 84, 563-572.

Centra, J. A. (1979). Determining faculty effectiveness. San Francisco, CA: Jossey-Bass.

Centra, J. A. (1974). The relationship between student and alumni rating of teachers. Journal of Educational and Psychological Measurement, 34, 321-326.

Chang, B. L. (1984). Adotion of innovation:L Nursing and computer use. Computers in Nursing, 2, 229-235.

Chinien, C. A. & Boutin, F. (1993). Cognitive style FD/I: An important learning characteristic for educational technologists. Journal of Educational technology Systems, 21(4), 303-311.

Clark, K. C. & Peterson, P. L. (1986). Teachers' thought processes. In M. C. Wittrock (Ed.). Handbook of Research on Teaching (pp. 255- 296). New York: Macmillan Publishers.

Claxton, C. S. & Murrell, P. H. (1987). Learning Styles: Implications for Improving Educational Practices. ASHE-ERIC Higher Education Reports No. 4. Washington, DC

Clifford, M. M. (1973). How learning and liking are related -- a clue. Journal of Educational Psychology, 64, 183-186.

Collis, B. (1987). Sex differences in the association between secondary school students' attitudes toward mathematics and toward computers. Journal for Research in Mathematics Education, 18, 394-402.

Coover, D. & Delcourt, M. A. B. (1992). Construct and criterion-related validity of adult attitude toward computers survey for a sample of professional nurses. Educational and Psychological Measurement, 52, 653-661.

Cothern, N.B., & Collins, M.D. (1992). An exploration: Attitude acquisition and reading instruction. Reading Research and Instruction, 31(2), 84-97.

Crandall, V. C., Katovsky, W., & Crandall, V. J. (1965). Childrens' beliefs in their control of reinforcement in intellectual academic achievement behaviors. Child Development, 36, 91-109.

Cross, P. K. (1976). Accent on Learning. San Francisco, CA: Jossey-Bass Publishers.

Dambrot, F. H., Watkins-Malek, M. A., Silling, S. M., Marshall, R. S., & Garver, J. A. (1985). Correlates of sex differences in attitudes toward and involvement with computers. Journal of Vocational Behavior, 27, 71-86.

Davis, A. M. (1999). Effects of computer anxiety-apprehension and cognitive styles on students' academic performance. A Dissertation Pilot Study, Grambling State University, Grambling, Louisiana.

Davis, K. R., & Sauser, W. I. (1993). A comparison of factor weighting methods in job evaluation: Implications for compensation system. Public Personnel Management, 22(1), 91-106.

Delcourt, M .A .B. (1985). Development of an instrument to measure attitudes toward computers: Does computer accessibility or sex make a difference in attitudes? Paper presented at the Annual Meeting of the Northeastern Educational Research Association, Kerhonkson, NY.

Delcourt, M.A.B. & Kinzie, M.B. (1993). Computer technologies in teacher education: the measurement of attitudes and self-efficacy. Journal of Research and Development in Education, 27(1), 35-41.

Dempsey, J. & Sales, G. C. (1993). Interactive instruction and feedback. Englewood Cliffs, NJ: Educational Technology Publications.

Doyle, K. O. (1975). Student evaluation of instruction. Lexington, MA: DC. Health.

Dunn, R. (1981). Teaching in a purple fog: What don't we know about learning style. NASSP Bulletin, 65, 336.

Dwyer, F. M., & Moore, D. M. (1991). Effect of color coding on visually oriented test

with students of different cognitive styles. The Journal of Psychology, 125, 678-680.

Dwyer, F. M., & Moore, D. M. (1992). Effect of color coding on visually and verbally oriented and test with students of different field dependence levels. Journal of Educational Technology Systems, 20, 311-320.

Dwyer, F. M., & Moore, D. M. (1994). Effect of color coding and test type (visual/verbal) on students identified as possessing different field dependence levels. Paper presented at the International Visual Literacy Association. Annual Meeting, Temple, AZ.

Elliot, C. A. (1976). The effects of instructional designs matches to individual differences in cognitive styles on concept learning: A trait-treatment interaction study. Paper presented at the AERA, San Francisco, CA. (ERIC Document Reproduction Service No. ED122973).

Elmore, P. B. & LaPointe, K. (1975). Effect of teacher sex, student sex, and teacher warmth on the evaluation of college instructors. Journal of educational Psychology, 67, 368-374.

Elmore, P. B. & LaPointe, K. (1974). Effect of teacher sex and student sex on the evaluation of college instructors. Journal of educational Psychology, 66, 386-389.

Elmore, P. B. & Pohlman, J. T. (1978). Effect of teacher, student, and class characteristics on the evaluation of college instructors. Journal of Educational Psychology, 70, 187-192.

Etnaugh, C. & Rose, S. (1975). Adolescents' sex bias in the evaluation of performance. Developmental Psychology, 11, 663-664.

Everett, D. R. & Ahern, T. C. (1994). Computer mediated communication as a teaching tool: A case study. Journal of Research on Computing on Education, 26(3), 336-357.

Eysneck, M. W. (1993). Principles of Cognitive Psychology. Hillsdale: Lawrence

Erlbaum & Associates Ltd. Publishers.

Feldman, K. A. (1993). College students' views of male and female college teachers: Part II -- evidence from students' evaluation of their classroom teachers. Research in Higher Education, 34,151-191.

Feldman, K. A. (1992). College students' views of male and female college teachers: Part II-evidence from social laboratory and experience. Research in Higher Education, 33, 317-374.

Feldman, K. A. (1989). The association between student ratings of specific instructional dimensions and student achievement: Refining and extending the synthesis of data from multisection validity studies. Research in Higher Education, 30, 583-645.

Feldman, K. A. (1988). Effective college teaching from the students' and faculty's view: Matched or mismatched priorities. Research in Higher Education, 28, 291-344.

Feldman, K. A. (1983). Seniority and experience of college teachers as related to evaluations they receive from students. Research in Higher Education, 18, 3-124.

Feldman, K. A. (1977). Consistency and variability among college students in rating their teachers and courses: A review and analysis. Research in Higher Education, 6, 223-274.

Ferber, M. A. & Huber, J. A. (1975). Sex of student and instructor: A study of student bias. American Journal of Sociology, 80, 949-963.

Gagne, R. M. (1982). Development in learning psychology: Implications for instructional design; and effects of computer technology on instructional design and development. Educational Technology, 22(6), 11-15.

Galitz, W. O. (1989). Handbook of Screen Format Design, (3rd. Ed.). Wellesley, MA:

QED Information Science, Inc.

Galitz, W. O. (1994). It's Time to Clean your Windows: Designing GUIs that Work. New York, NY: Wiley Publishers.

Galloway, D., Leo, E. L., Rogers, C., & Armstrong, D. (1996). Maladaptive motivational styles: The role of domain specific task demand in English and mathematics. British Journal of Educational Psychology, 66, 197-207.

Garcia, R. L. (1991). Teaching in a pluralistic society: Concepts, models, and strategies, (2nd. ed). New York, NY: Harper Collins Publishers.

Gardner, D. G., Discenza, R. & Dukes, R.L.(1993). The measurement of computer attitudes: An empirical comparison of available scales. Journal of Educational Computing Research, 9(4), 487-507.

Goodlad, J. (1980). Behind the classroom door. Worthington, OH: Wadsworth.

Gould, J. D., & Grischkowski, N. (1983). Doing the same work with paper and cathode ray tube display (CRT). Human Factors, 25, 329-338.

Grabinger, R. S., & Amedeo, D. (1988). CRT text layout: Perceptions of viewers. Computers in Human Behavior, 4, 189-205.

Greco, A. A. & McClung, C. (1979). Interaction between attention directing and cognitive style. Journal of Educational Communication and Technology, 27, 97-102.

Grieve, T. D. & Davis, J. K. (1971). The relationship of cognitive styles to performance in ninth grade geography. Journal of Educational Psychology, 53, 110-118.

Griffin, R. & Franklin, G. (1996). Can college academic performance be predicted using a

measure of cognitive style? Journal of Educational Technology Systems, 24(4), 375-379.

Hall, G. E. (1978). Teacher concerns as a basis for facilitating the personalizing staff development. Teacher College Record, 80(1), 36-53.

Hannafin, M. J., & Hooper, S. (1989). An integrated framework for CBI screen design and layout. Computers in Human Behavior, 5, 155-165.

Hathaway, M. D. (1984). Variables of computer screen display and how they affect learning. Educational Technology, 7-11.

Henderson, R. W. & Landesman, E. M. (1995). Effects of thematically integrated mathematics instruction on students of Mexican descent. Journal of Educational Research, 88, 290-299.

Hsu, C. L. & Wedman, J. F. (1994). Content emphasis, practice, and cognitive style in analogical problem solving. Journal of Research and Development in Education, 28(1), 1-10.

Huang, J. C. (1995). Effects of types of feedback on achievement and attitudes during computer based cooperative condition. Educational Resource Information Center (Document No. ED 383 304).

Huberman, A. M. & Miles, M. (1984). Innovation up close. How school improvement works. New York: Plenum Press.

Ikegulu, N. T. (1999). Effects of mathematics anxiety on academic performance and persistence for developmental learners. Manuscript pending review with Journal for Research in Mathematics Education.

Ikegulu, N. T. (1999). Gender and mathematics anxiety-apprehension: Academic and

occupational preference of developmental learners. Manuscript pending review, EDUCATION Journal.

Ikegulu, N. T. (1997). Effectiveness of mediated instructional strategies and learning styles in muticulturally linguistic environments: Implications for developmental educators. ERIC Clearinghouse and Journal of Resources in Education (ERIC Document Reproduction Service No. ED 409 757).

Ikegulu, P. R. (1998). Effects of screen design in CBI environments. ERIC Document Reproduction Service No. ED 428 757).

Ikegulu, T. N. & Ikegulu, P. R. (1999). The effectiveness of window presentation strategies and cognitive Styles of field-dependence status on learning from mediated instruction. ERIC Document Reproduction Service No. ED 428 758).

Isaac, S. & Michael, W.B. (1995). Handbook in research and evaluation. San Diego, CA: Educational and Industrial Testing Services.

Ivey, K. M. C. (1986). Mechanistic and organic: Dual cultures in a mathematics classroom. Journal of Research and Development in Education, 29,141-151.

Jobson, J. D. (1992). Applied multivariate data analysis, Volume II: Categorical and multivariate methods. New York: Springer-Verlag.

Johnson, P. E. & Johnson, R. E. (1996). The role of concrete-abstract thinking levels in teacher' multiethnic beliefs. Journal of Research and Development in Education, 29(3),134-140.

Johnson, W. S. & Morris, D. C. (1982). Students as active participants: The case for students oriented research. Educational Research Quarterly, 6(4), 38-45.

Jonassen, D. H. (1989). Functions, applications, and design guidelines for multiple window environments. Computers in Human Behavior, 5, 185-194.

Karabenick, S. A. (1996). Social influences on metacognition: Effects of colearner questioning on comprehension monitoring. Journal of Educational Psychology, 88, 860-703.

Keeler, C. M. (1996). Networked instructional computers in the elementary classroom and their effect on the learning environment: a qualitative evaluation. Journal of Research on Computing in Education, 28(3), 329-345.

Kelly, E. F. & Chapman, D. W. (1977). Explaining course-oriented attitude: A canonical analysis. Educational Research Quarterly, 2(3), 52-60.

Kelly, E. F. & Chapman, D., Pascarella, E., & Terenzini, T. (1976). The development and use of the Adjective Rating Scale: A measure of attitude toward course and programs. Research Report 8. Syracuse: Syracuse University Center for Instructional Development.

Khan, S. & Weiss, J. (1973). The teaching of affective responses. In R. Travers, (Ed.), Second handbook of research on teaching. Chicago: Rand McNally & Co.

Kinney, D. P. & Smith, S. P. (1992). Age and teaching performance. Journal of Higher Education, 63, 282-302.

Kirby, P. (1979). Cognitive style, learning styles, and transfer skill acquisition. The National Center for Research in Vocational Education, The Ohio State University, Columbus, OH:

Kolb, D. A. (1976). Experiential learning: Experience as the source of learning and development. Englewood Cliffs, NJ: Prentice-Hall.

Kolb, D. A. (1984). Learning styles inventory. Boston, MA: McBer & Co.

Kruk, R. & Muter, P. (1984). Reading continuous text on video screens. Human Factors, 26(3), 339-345.

Kwok, D. C. & Lytton, H. (1996). Perceptions of mathematics ability versus actual mathematics performance: Canadian and Hong Kong Chinese Children. British Journal of Educational Psychology, 66, 209-222.

LaBonty, D. J. (1989). Computer assisted homework in accounting: Effects on student achievement and attitude. The Delta Pi Epsilon Journal, 31(2),47-55.

Lamberski, R. J., & Dwyer, F. M. (1983). The instructional effects of coding (color and black & white) on information acquisition and retrieval. Educational Communication and Technology Journal, 31(1), 9-21.

Lee, C. H. (1994). The effects of auditory cues in interactive multimedia and cognitive style on reading skills of third graders. Dissertation Abstracts, Series B.

Livingston, L. A. (1991). The effects of color on performance in an instructional gaming environment. Journal of Research on Computing in Education, 24, 246-253.

Lortie, D. (1975). Schools: A sociological study. Chicago: University of Chicago Press.

Loyd, B. H. & Gressard, C. (1984). Reliability and factorial validity of computer attitude scales. Educational and Psychological Measurement, 48, 517-521.

Lyons-Lawrence, C. L. (1994). Effect of learning style on performance in using computer based instruction in office systems. The Delta Pi Epsilon Journal, 36(3), 167-175).

Marsh, H. W. & Roche, L. (1993). The use of students' evaluation and an individually structured intervention to enhance university teaching effectiveness. American Educational

Research Journal, 30, 217-251.

Mavarech, Z. R. & Susak, Z. A. (1993). Effects of learning with cooperative-mastery method on elementary students. Journal of Educational Research, 86, 197-205.

McGregor, J. (1993). Effectiveness of role playing and antiracist teaching in reducing student prejudice. Journal of Educational Research, 86, 215-228.

McKeachie, W. J. & Lin, Y. G. (1978). A note on validity of student ratings of teaching. Educational Research Quarterly, 4(3), 45-47.

McKeachie, W. J. & Lin, Y. G. (1971). Sex differences in student response to college teachers: Teacher warmth and teacher sex. American Educational Research Journal, 8, 221-226.

McKeachie, W. J. , Pintrich, P. R., & Lin, Y. G. (1985). Learning to learn. In G. D'Ydwelle (Ed.). Cognition, information processing, and motivation (pp. 601-618). Armstadam-Elseviers.

McShane, S. L. (1990). Two tests of direct gender bias in job evaluation ratings. Journal of Occupational Psychology, 63, 129-140.

Mehbrabian, A. & Hines, M. (1978). A questionnaire measure of individual differences in dominance-submissiveness. Educational and Psychological Measurement, 38, 479-484.

Messick, S. (1976). Personality consistencies in cognition and creativity. In S. Messick & Assoc. (Eds.), Individuality in Learning. San Francisco, CA: Jossey-Bass.

Messick, S. (1984). The nature of cognitive styles: Problems and promise in educational practice. Educational Psychologist, 19, 59-74.

Miura, I. T. (1987). The relationship of computer self-efficacy expectations to computer

interest and course enrollment in college. Sex Roles, 16, 303-311.

Moore, D. M., & Dwyer, F. M. (1991). Effects of color coded information on students' levels of field dependence. Perceptual and Motor Skills, 72, 611-616.

Murphy, C. A. (1986). Assessment of computer self-efficacy: Instrument development and validation. Paper presented at the Annual Meeting of the National Council on Measurement in Education, San Francisco.

Necessary, J. R. & Parish, T. S. The relationships between computer usage and computer-related attitudes and behaviors. Education, 116(3), 384-386.

Neter, J., Wasserman, W., & Kutner, M. H. (1989). Linear statistical models. Boston, MA: Wiley.

O'Brien, T. P. (1994). Cognitive learning styles and academic achievement in secondary education. Journal of Research and Development in Education, 28(1), 11-20.

O'Connell, D. Q. & Dickinson, D. J. (1993). Student rating of instruction as a function of testing condition and perception of amount learned. Journal of Research and Development in Education, 27, 18-23.

Ogunyemi, A. O. & Ikegulu, T. N. (1998). The Differential Effects of Students' Gender and Expected Course Grades on Faculty Evaluation. Louisiana Educational Research Journal, 13(2), 23-50.

Owens, S. V. (1986). Using self-efficacy in program evaluation. Paper presented at the Annual Meeting of the American Educational research Association, San Francisco.

Parker, C. S. (1994). Understanding computers & information processing: Today and tomorrow. Orlando, FL: The Dryden Press.

Parish, T.S. & Necessary, J. R. An examination of cognitive dissonance and computer attitudes. Education, 116(4), 565-566.

Pascarella, E. T., Duby, P., & Iverson, B. (1983). A test and reconceptualization of a theoretical model of college withdrawal in a commuter institution setting. Sociology of Education, 56, 88-100.

Pedahzur, E. J. (1982). Multiple regression in behavioral research: Explanation and prediction. (2nd ed.). Forth Worth, TX: Holt, Rinehardt and Winston.

Pedahzur, E. J. & Schmelkin, L. P. (1991). Measurement, design, and analysis: An integrated approach. Hillsdale, NJ: Lawrence Erlbaum Associates.

Peterson, S. E. (1992). A comparison of causal attributions and their dimensions for individual and cooperative group tasks. Journal of Research and Development in Education, 25(2), 103-112.

Pitts, M. M., & Thompson, B. (1984). Cognitive style as mediating variables: Inferential comprehension. Reading Research Quarterly, 29(4), 426-428.

Rambally, G. K., & Rambally, R. S. (1987)Human factors in CAI design. Computer Education, 11(2), 149-153.

Rayner, K. (1992). Eye movement and visual cognition: Introduction. In K. Rayner (Ed.), Eye Movement and Visual Cognition: Scene Perception and Reading (pp. 1-7). New York: Springer-Verlag.

Ross, S. M., Smith, L. S., & Morrison, G. R. (1993). The longitudinal influences of

computer intensive learning experiences on at-risk elementary students. Educational Technology Research and Development, 39(4), 33-46.

Roswal, G. M., Croce, R., Horvat, M. A., Evans, M. D., Block, M., et al., (1995). Effects of collaborative peer tutoring on urban seventh graders. Journal of Educational Research, 88, 275-280.

Schwarz, E., Beldie, I. P., & Pastoor, S. (1983). A comparison for paging and scrolling for changing screen contents by inexperienced users. Human Factors, 25(3), 279-282.

Shelly, G.B., Cashman, T. J., Waggoner, G.A., & Waggoner, W.C. (1992). Complete computer concepts and microcomputer applications. Danvers, MA: Boyd & Fraser Publishing Company.

Sheriff, D. E. & William, J. A. (1980). Field-dependence/ field-independence and instructional Development. Paper presented at the annual AECT convention, Denver, CO.

Shneiderman, B. (1992). Designing the user interface: Strategies for Effective Human-Computer Interaction (2nd ed.). New York: Addison-Wesley.

Shneiderman, B. & Kearsley, G. (1989). Hypertext hands-on! An Introduction to a New Way of Organizing and accessing information. New York: Addison-Wesley.

Spiro, R. J., & Tirre, W. C. (1980). Individual differences in schema utilization during discourse processing. Journal of Educational Psychology, 72, 204-208.

Stark, H. A. (1990). Pop-up windows and memory for text. (In D. Diaper, D. Gilmore, G. Cocton, & B. Shackel Eds.), Human Computer Interactions-INTERACT'90 (pp. 67-72). Amsterdam: Elsevier Science Publishers.

Strom, B. & Hocevar, D. (1990). Preference for course structure and student control. Educational Research Quarterly, 14(3), 21-25.

Taynor, J. & Deaux, K. (1973). When women are more deserving than men: Equity, attribution, and perceived sex differences. Journal of Personality and Social Psychology, 28, 360-367.

Terrell, S. & Rendulic, P. (1996). Using computer managed instruction software to increase motivation and achievement in elementary school children. Journal of Research on Computing in Education, 28(3), 403-414.

Thurston, T.G. & Jeffrey, T. E. (1980). Closure Flexibility (Concealed Figures Form A). The University of Chicago: Human Resources Center.

Tombaugh, J., Lickorish, A., & Wright, P. (1987). Multi-window display for readers of lengthy texts. International Journal of Man-Machine Studies, 26(2), 597-615.

Tyler, R. W. (1969). Basic principles of curriculum and instruction. Chicago, IL: University of Chicago Press.

Veith, R. H. (1988). Visual Information Systems: The Power of Graphics and Video. Boston, MA: Hall & Company Publishers.

Wallace, S. Q. & Gregory, R. A. (1985). Cognitive style: The unaccommodated variables in training decisions. Performance and Instructional Journal, 24(4), 22-23.

Walters, J. E. & Necessary, J. R. An attitudinal comparison toward computers between underclassmen and graduating seniors. Education, 116(4), 623-630.

Wheeless, V. E. & Potori, P. F. (1989). Students assessment of teachers' masculinity and femininity: A test of the sex role congruency hypothesis on student attitude toward learning. Journal of Educational Psychology, 81, 259-363.

Witkin, H. A. (1979). Cognitive styles in educational setting. New York University, 8, 14-20.

Witkin, H. A. (1976). Cognitive styles in academic performance and teacher-student relations. In S. Messick& Associates (Eds.). Individuality in learning. San Francisco, Jose Bass.

Witkin, H. A., Dyk, R., Faterson, H. F., Goodenough, D. R., & Karp, S. A. (1974). Psychological differentiation: Studies of development. New York: Wiley.

Witkin, H. A., & Goodenough, D. R. (1981). Cognitive styles: Essence and origins, field dependence and field independence. New York, NY: International University Press.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. (1977). Filed-dependent and field-independent cognitive styles and their educational implications. Review of Educational Research, 47(1), 1-64.

Witkin, H. A., Oltman, P. K., & Karp, S. A. (1971). A Manual for the Embedded Figure Tests. Palo Alto, CA.: Psychologists Press.

Wlodkowski, R. J. (1985). Enhancing adult motivation to learn. San Francisco, CA: Jossey-Bass.

Wood, J. B. (1992). The application of computer technology and cooperative learning in developmental algebra at the community college. Educational Resource Information Center (Document No. ED 352 009).

Young, J. D. (1996). The effects of self-regulated learning strategies on performance in learner-controlled CBI. Journal of Educational Technology and Research Development, 44(2), 17-27.